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# Public Health Reports

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## Statistical Studies of Heart Disease

### IX. Race and Sex Differences in the Trend of Mortality From the Major Cardiovascular-Renal Diseases

By I. M. Moriyama and Theodore D. Woolsey*

Several of the extraneous factors influencing the trend of mortality from diseases of the heart and other cardiovascular-renal diseases were discussed in the second report of this series (*1*). Among these were: (1) the changes in the death registration area of the United States since 1900; and (2) the changes in classification procedures and medical certification. It was pointed out that the incompleteness of the registration area prior to 1933 introduced a bias in the measurement of the trend which was impossible to eliminate entirely. The same was true of the bias caused by changes in classification, form of medical certification on the death certificate, and medical knowledge and habits of diagnosis on the part of the certifying physicians. However, much of the disturbance from these latter sources was felt to be eliminated, at the expense of some specificity, by grouping the various so-called cardiovascular-renal diseases and studying the trend of the broad group. The effect of shifts in the age composition of the population was relatively easily controlled by the use of age-adjusted and age-specific death rates.

In the discussion of the trend of broad disease groupings, it was stated that "for the group of diseases which reflect damage to the heart, kidneys, and arterial system resulting from hypertension and arteriosclerosis the basic risk of dying for persons over 35 years of age is neither rising nor falling." While this statement holds true for the entire group of persons who have passed their 35th birthday, when trends for males and females and for white and nonwhite persons are examined separately, some striking differences appear. These differences are the subject of the present report.

Since the incompleteness of the registration area in the earlier years

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raises problems about the comparability of the population group studied, this study was restricted to the period from 1920 on. In 1920, 83.2 percent of the white population of the country and 66.1 percent of the nonwhite population were included in the death registration States. By 1930, these percentages had increased to 95.7 and 93.3, respectively. While the addition of States to the registration area between 1920 and 1933, when the area became complete, undoubtedly distorts the trends slightly, the amount of such disturbance is not considered to be greater than that caused by some of the other uncontrollable elements that have already been mentioned. The chief among these are the diagnostic, medical certification, and classification procedures.

If it were possible, we should like to remove by some sort of adjustment all artificially produced effects upon the mortality and then to isolate for study purposes the trends for each major population group and each different environment. If this could be done, the trends in the risk of dying from the cardiovascular-renal diseases in each group could be observed, and reasonable hypotheses to explain these trends could be formulated. These hypotheses could then be tested by experiment. In practice, however, it is only possible to approximate very roughly this ideal approach. In the first place, some of the artificially produced effects cannot be controlled, and, in the second place, data are not available to show trends for as many different subgroups of the population as might be desirable.

An example of an important demographic factor that probably is related to the risk of succumbing to cardiovascular-renal disease is the increase in the proportion of persons living in urban areas. From 1920 to 1947, this proportion rose from 51.2 percent to approximately 59.0 percent for the country as a whole. However, the proportion of persons in urban areas of the death registration States in 1920 was 57.2 percent. Hence, between 1920 and the present time the distribution of the population by urban or rural residence has not changed as much in the group of death registration States as it has in the country as a whole. This factor, therefore, could not be considered responsible for the changes in mortality that will be shown here.

In any case, time series of death rates that are specific for cause of death, age, race, sex, and urban or rural residence are not available in the official vital statistics of the United States, but rates specific for all characteristics except the last are shown in graphs to follow and in tables 1 and 2.[1]

The group of diseases included under the heading of heart disease in this report is the same as in other mortality papers of this series, namely, heart disease of infectious origin (other than that specified as syphilitic or acute rheumatic), functional heart disease without mention of organic lesion, chronic myocarditis,

[1] See the fourth report of this series (*8*) for an analysis of age-adjusted cardiovascular renal mortality among white persons in 1940, by sex and size of city.

Table 1. *Age-specific death rates per 100,000 population for the major cardiovascular-renal diseases at ages 25 years and over: United States Death Registration States, 1920–47*

[Rates in parentheses in first column are based on population including armed forces overseas; all other rates are based on population exclusive of armed forces overseas]

| Year | Age | | | | | | |
|---|---|---|---|---|---|---|---|
| | 25–34 years | 35–44 years | 45–54 years | 55–64 years | 65–74 years | 75–84 years | 85 years and over |
| | White males | | | | | | |
| 1947 | 33.2(32.7) | 138.1 | 502.7 | 1276.9 | 3055.4 | 6805.8 | 16016.1 |
| 1946 | 35.2(34.3) | 136.8 | 485.2 | 1230.9 | 2919.7 | 6573.2 | 14903.6 |
| 1945 | 50.0(35.5) | 149.4 | 503.9 | 1275.9 | 3013.0 | 6798.4 | 14454.8 |
| 1944 | 45.5(35.7) | 146.8 | 491.5 | 1267.9 | 3031.5 | 6959.0 | 14089.4 |
| 1943 | 43.5(39.3) | 146.6 | 498.7 | 1302.1 | 3156.8 | 7391.2 | 15096.4 |
| 1942 | 41.1(39.8) | 144.5 | 489.2 | 1272.8 | 3022.0 | 6918.9 | 13634.2 |
| 1941 | 39.0 | 141.3 | 475.4 | 1259.8 | 3027.9 | 7132.4 | 13921.1 |
| 1940 | 41.8 | 139.7 | 471.7 | 1271.7 | 3099.2 | 7421.2 | 14509.9 |
| 1939 | 40.7 | 138.1 | 458.5 | 1219.8 | 2991.4 | 7362.4 | 14070.4 |
| 1938 | 41.5 | 136.8 | 444.1 | 1188.7 | 2945.2 | 7270.0 | 13390.7 |
| 1937 | 43.8 | 139.2 | 454.7 | 1229.6 | 2963.7 | 7545.9 | 13792.9 |
| 1936 | 43.2 | 140.7 | 451.4 | 1248.0 | 3037.4 | 7782.8 | 14565.6 |
| 1935 | 43.6 | 131.9 | 430.8 | 1193.5 | 2931.3 | 7287.9 | 13509.9 |
| 1934 | 43.9 | 134.3 | 436.6 | 1196.2 | 2956.0 | 7241.2 | 13374.2 |
| 1933 | 43.6 | 129.3 | 417.6 | 1181.7 | 2927.5 | 7013.1 | 12951.8 |
| 1932 | 44.5 | 131.6 | 412.6 | 1165.6 | 2948.9 | 7102.9 | 13558.3 |
| 1931 | 45.4 | 132.7 | 411.2 | 1149.1 | 2907.8 | 6849.4 | 12884.6 |
| 1930 | 47.9 | 133.0 | 408.6 | 1162.4 | 2999.2 | 7018.8 | 13030.7 |
| 1929 | 48.9 | 134.7 | 407.5 | 1140.4 | 3043.8 | 7211.6 | 13485.5 |
| 1928 | 49.8 | 137.9 | 406.3 | 1128.8 | 3084.5 | 7500.3 | 14134.3 |
| 1927 | 48.0 | 132.5 | 389.5 | 1080.1 | 2933.9 | 7099.2 | 13493.4 |
| 1926 | 49.7 | 131.3 | 398.7 | 1101.8 | 3039.0 | 7468.9 | 14367.9 |
| 1925 | 48.9 | 126.9 | 380.9 | 1076.3 | 2873.5 | 7090.8 | 13572.6 |
| 1924 | 48.6 | 126.9 | 378.0 | 1052.7 | 2847.5 | 6937.9 | 12889.2 |
| 1923 | 49.3 | 124.4 | 369.4 | 1073.1 | 2874.0 | 6944.3 | 13111.5 |
| 1922 | 46.4 | 119.1 | 354.6 | 1041.2 | 2848.4 | 6727.3 | 12477.6 |
| 1921 | 46.7 | 110.1 | 328.8 | 972.3 | 2647.5 | 6342.6 | 11867.1 |
| 1920 | 50.3 | 117.7 | 339.4 | 1007.5 | 2749.0 | 6575.3 | 11929.5 |
| | White females | | | | | | |
| 1947 | 23.4 | 69.2 | 228.3 | 648.1 | 2096.4 | 5771.2 | 15764.2 |
| 1946 | 25.2 | 73.4 | 232.1 | 659.2 | 2067.5 | 5701.3 | 14389.0 |
| 1945 | 28.5 | 78.9 | 246.9 | 693.3 | 2147.6 | 5881.8 | 13714.6 |
| 1944 | 29.4 | 82.8 | 254.1 | 715.5 | 2186.8 | 6071.0 | 13408.1 |
| 1943 | 33.7 | 90.2 | 269.8 | 761.8 | 2303.4 | 6400.1 | 13977.4 |
| 1942 | 33.3 | 88.2 | 262.3 | 734.7 | 2202.8 | 6015.9 | 12747.2 |
| 1941 | 32.7 | 87.8 | 261.4 | 743.0 | 2223.8 | 6171.1 | 12786.9 |
| 1940 | 34.7 | 92.4 | 271.8 | 770.4 | 2335.7 | 6466.5 | 13657.8 |
| 1939 | 36.7 | 94.5 | 277.7 | 789.0 | 2314.8 | 6577.3 | 13155.6 |
| 1938 | 36.5 | 96.5 | 280.9 | 779.4 | 2302.9 | 6438.1 | 12570.1 |
| 1937 | 39.8 | 100.9 | 287.5 | 807.4 | 2323.8 | 6583.6 | 12803.6 |
| 1936 | 41.4 | 104.9 | 298.2 | 833.9 | 2431.6 | 6827.0 | 13457.1 |
| 1935 | 42.2 | 102.0 | 296.7 | 816.8 | 2345.0 | 6355.8 | 12434.6 |
| 1934 | 42.6 | 104.3 | 299.7 | 835.7 | 2385.4 | 6427.9 | 12489.8 |
| 1933 | 43.3 | 104.4 | 297.2 | 839.0 | 2385.9 | 6256.4 | 12054.5 |
| 1932 | 46.2 | 109.3 | 305.7 | 856.5 | 2471.5 | 6434.2 | 12544.8 |
| 1931 | 47.3 | 111.9 | 308.8 | 864.1 | 2397.9 | 6104.3 | 11659.6 |
| 1930 | 49.7 | 115.9 | 319.5 | 885.5 | 2502.0 | 6298.8 | 12095.4 |
| 1929 | 51.8 | 119.5 | 326.8 | 892.5 | 2562.0 | 6507.2 | 12821.8 |
| 1928 | 53.7 | 127.1 | 337.3 | 900.2 | 2604.6 | 6709.5 | 13702.1 |
| 1927 | 53.2 | 123.0 | 330.7 | 865.5 | 2492.2 | 6352.8 | 12996.9 |
| 1926 | 51.6 | 128.2 | 342.0 | 924.4 | 2591.0 | 6729.3 | 14061.3 |
| 1925 | 53.4 | 126.7 | 336.5 | 888.9 | 2499.0 | 6383.5 | 13735.7 |
| 1924 | 52.5 | 126.4 | 342.9 | 880.0 | 2464.6 | 6325.8 | 12859.1 |
| 1923 | 54.0 | 131.1 | 343.7 | 905.4 | 2543.8 | 6403.7 | 13066.6 |
| 1922 | 54.5 | 129.1 | 337.9 | 889.9 | 2532.9 | 6207.5 | 12396.4 |
| 1921 | 55.3 | 124.5 | 337.1 | 878.6 | 2443.5 | 5923.7 | 11173.0 |
| 1920 | 65.9 | 136.1 | 353.3 | 927.8 | 2552.1 | 6135.5 | 11215.2 |

and coronary artery disease associated with hypertension and/or arteriosclerosis. Deaths attributed to these as a sole or primary cause are included, and the last two types, chronic myocarditis and coronary artery disease, account for more than three-quarters of the deaths assigned to the heart disease group as a whole. The title "major cardiovascular-renal diseases" used here includes the heart disease

Table 2. *Age-specific death rates per 100,000 population for the major cardiovascular-renal diseases at ages 25 years and over: United States Death Registration States, 1920–47*

[Rates in parentheses in first column are based on population including armed forces overseas; all other rates are based on population exclusive of armed forces overseas]

| Year | Age | | | | | | |
|---|---|---|---|---|---|---|---|
| | 25–34 years | 35–44 years | 45–54 years | 55–64 years | 65–74 years | 75–84 years | 85 years and over |
| | Nonwhite males | | | | | | |
| 1947 | 75.1 (74.3) | 282.4 | 942.6 | 1852.6 | 3391.5 | 5006.5 | 7515.0 |
| 1946 | 73.7 (72.4) | 282.3 | 916.7 | 1776.1 | 3167.8 | 4551.1 | 7227.9 |
| 1945 | 102.5 (79.3) | 325.4 | 947.1 | 1810.7 | 3318.2 | 4873.9 | 7701.0 |
| 1944 | 100.1 (84.3) | 326.1 | 985.5 | 1811.3 | 3436.1 | 4864.3 | 8377.8 |
| 1943 | 101.6 (97.8) | 339.2 | 1023.0 | 1919.5 | 3577.6 | 5311.5 | 8655.6 |
| 1942 | 110.6(109.2) | 362.7 | 1032.6 | 1848.2 | 3525.7 | 5045.1 | 8269.5 |
| 1941 | 112.6 | 360.1 | 1042.1 | 1874.1 | 3676.6 | 5448.4 | 8984.4 |
| 1940 | 119.3 | 361.0 | 1050.6 | 1916.9 | 3719.1 | 5821.1 | 9510.4 |
| 1939 | 120.3 | 367.2 | 1001.3 | 1950.3 | 3069.0 | 5903.6 | 8546.8 |
| 1938 | 122.3 | 401.4 | 1043.9 | 1904.8 | 3220.4 | 5662.1 | 8454.1 |
| 1937 | 131.4 | 407.6 | 1050.3 | 1962.3 | 3342.2 | 5985.3 | 9044.5 |
| 1936 | 133.9 | 431.5 | 1056.4 | 2016.9 | 3330.8 | 6235.1 | 9658.7 |
| 1935 | 131.0 | 405.9 | 986.6 | 1889.7 | 3022.9 | 5720.5 | 8996.0 |
| 1934 | 141.7 | 420.1 | 1034.0 | 1954.2 | 3292.4 | 6108.9 | 9571.3 |
| 1933 | 132.2 | 390.1 | 945.2 | 1881.9 | 3068.4 | 5543.9 | 9111.9 |
| 1932 | 134.3 | 411.6 | 969.2 | 1932.1 | 3160.7 | 5996.4 | 9465.5 |
| 1931 | 152.1 | 448.9 | 1016.6 | 1984.7 | 3387.2 | 6334.8 | 9973.0 |
| 1930 | 164.5 | 473.9 | 1150.3 | 2140.9 | 3804.3 | 6411.5 | 10461.1 |
| 1929 | 168.2 | 483.8 | 1103.6 | 1939.3 | 3701.8 | 6484.8 | 10548.2 |
| 1928 | 169.9 | 459.7 | 1114.1 | 1918.8 | 3564.3 | 6538.5 | 10613.0 |
| 1927 | 140.8 | 435.5 | 1021.7 | 1762.7 | 3428.5 | 6060.1 | 11477.2 |
| 1926 | 157.3 | 455.2 | 1130.2 | 1825.5 | 3593.4 | 6591.3 | 12508.5 |
| 1925 | 145.8 | 426.3 | 1044.2 | 1769.3 | 3603.0 | 6514.9 | 13693.2 |
| 1924 | 138.7 | 411.8 | 988.8 | 1693.9 | 3405.1 | 6543.9 | 13028.3 |
| 1923 | 134.1 | 354.1 | 847.4 | 1500.8 | 3118.3 | 6013.9 | 11499.1 |
| 1922 | 123.9 | 328.4 | 775.4 | 1384.3 | 2839.4 | 5475.3 | 10096.3 |
| 1921 | 124.2 | 315.6 | 678.4 | 1320.8 | 2784.6 | 5532.0 | 8976.1 |
| 1920 | 134.3 | 294.3 | 688.8 | 1408.2 | 3053.7 | 5589.2 | 9298.4 |
| | Nonwhite females | | | | | | |
| 1947 | 86.9 | 311.9 | 869.1 | 1742.3 | 3153.6 | 3999.0 | 5435.6 |
| 1946 | 93.8 | 316.2 | 845.6 | 1704.6 | 2927.4 | 3613.4 | 5403.6 |
| 1945 | 96.9 | 346.0 | 899.4 | 1753.0 | 2982.4 | 3833.3 | 5830.1 |
| 1944 | 105.1 | 367.7 | 918.7 | 1806.5 | 3063.2 | 4019.4 | 6389.6 |
| 1943 | 113.0 | 393.2 | 984.2 | 1921.6 | 3191.8 | 4268.8 | 6692.9 |
| 1942 | 110.3 | 375.6 | 982.5 | 1827.1 | 3136.2 | 3856.0 | 6219.0 |
| 1941 | 116.6 | 392.0 | 1033.8 | 1876.1 | 3150.3 | 4238.3 | 7025.8 |
| 1940 | 122.5 | 398.8 | 1037.3 | 1901.7 | 3271.3 | 4731.9 | 6951.2 |
| 1939 | 121.0 | 389.7 | 1009.3 | 2013.5 | 2764.5 | 4646.2 | 6753.5 |
| 1938 | 131.5 | 402.6 | 1032.7 | 2005.6 | 2795.9 | 4665.0 | 6835.8 |
| 1937 | 134.2 | 410.1 | 1026.3 | 2044.9 | 2901.3 | 4670.0 | 6935.8 |
| 1936 | 145.7 | 436.1 | 1032.4 | 2108.0 | 3048.3 | 5135.0 | 7551.4 |
| 1935 | 142.2 | 410.9 | 1003.1 | 1998.9 | 2794.3 | 4432.5 | 7190.2 |
| 1934 | 150.1 | 439.5 | 1057.8 | 2073.8 | 3108.0 | 4871.3 | 7272.0 |
| 1933 | 147.9 | 397.3 | 1042.1 | 2061.0 | 2983.2 | 4740.6 | 6726.5 |
| 1932 | 161.7 | 429.7 | 1060.6 | 2077.8 | 3059.1 | 4577.2 | 7173.3 |
| 1931 | 174.4 | 449.8 | 1111.8 | 2133.4 | 3270.8 | 4639.7 | 7093.4 |
| 1930 | 187.5 | 495.6 | 1194.3 | 2258.9 | 3445.3 | 4864.6 | 7880.4 |
| 1929 | 182.7 | 506.1 | 1158.9 | 2139.3 | 3301.9 | 5199.0 | 7867.9 |
| 1928 | 182.8 | 522.4 | 1177.7 | 2098.0 | 3474.1 | 5103.0 | 8347.2 |
| 1927 | 177.4 | 502.1 | 1143.0 | 1958.9 | 3323.4 | 5056.6 | 7815.3 |
| 1926 | 178.8 | 512.9 | 1207.6 | 1979.1 | 3523.0 | 5407.3 | 8779.6 |
| 1925 | 172.8 | 497.6 | 1141.0 | 1945.3 | 3499.5 | 5345.5 | 9438.8 |
| 1924 | 167.3 | 477.6 | 1172.4 | 1932.5 | 3426.1 | 5092.0 | 8556.2 |
| 1923 | 153.7 | 428.7 | 1059.7 | 1866.5 | 3138.9 | 4840.6 | 8572.2 |
| 1922 | 146.1 | 397.7 | 965.0 | 1792.4 | 2991.8 | 4714.7 | 7829.2 |
| 1921 | 167.9 | 391.8 | 921.4 | 1767.7 | 2949.0 | 4902.2 | 7677.2 |
| 1920 | 162.3 | 392.2 | 913.0 | 1684.6 | 3032.0 | 5014.1 | 7534.4 |

deaths (which had the codes 90–95 in the 1938 revision of the International List of Causes of Death) and also deaths attributed as a sole or primary cause to intracranial lesions of vascular origin (International List No. 83 in the 1938 revision) or to any form of nephritis (International List Nos. 130–132 in the 1938 revision).

In the trends shown graphically in the second report of the series (*1*), deaths

credited as primarily due to arteriosclerosis (International List No. 97) and idiopathic high blood pressure (International List No. 102) were included from the year 1930 on. These are shown separately in the appendix tables of that report. In this report these causes are excluded throughout. Mortality from the two causes combined has remained relatively stable ever since they were given separate titles in the International List. The crude death rate from these two causes in this period varied from 17 to 22 per 100,000 population.[2]

Examination of the race-sex subgroups does not offer any grounds for rejecting the hypothesis that there has been a shift in the assignment of cause of death away from the intracranial vascular lesions and nephritis and toward heart disease. Consequently, all graphs that are to follow will show trends for the group which we have called the "major cardiovascular-renal diseases."

## Variation With Age for Each Race-Sex Group

The pattern of variation with age in the trend of the total age-specific death rates for the cardiovascular-renal diseases was described in the second report of this series (*1*). Figures 1 and 2 show the corresponding pattern for each of the four race-sex groups.[3] The mortality has been plotted on a logarithmic scale because the emphasis is on relative rather than absolute changes.

The graph for white females seems to present a fairly consistent relationship between age and slope of the trend: going from the youngest age group shown (25–34 years) to the oldest, there is a gradual change from a marked downward slope to an appreciable upward slope at 85 years and over. (The addition of "senility" deaths would eliminate this last because there has been a steady decrease in the use of this term on death certificates. In all probability many such deaths are now assigned to one or the other form of cardiovascular-renal disease.)

The other three graphs do not show this same relationship between age and slope. Among white males there is an unmistakable upward trend at all ages between 35 and 65 years. This is particularly distinct at 45–54 years of age. At 65–74 years and 75–84 years there is no trend, and at 85 years and over there is an upward tendency which is almost identical with that for white females.

In the earlier years of the period under study, there is some rise in nonwhite male and female mortality at all ages. This may be due to the fact that the characteristics of the nonwhite population included in the death registration area changed quite rapidly in the

[2] Beginning with the statistics for 1949, deaths in the Federal vital statistics reports will be classified by cause according to the new International Statistical Classification of Diseases, Injuries, and Causes of Death, adopted in 1948. Beginning at the same time, the National Office of Vital Statistics will use the terms "cardiovascular diseases" and "cardiovascular-renal diseases" in a somewhat more inclusive manner than has been used in this series of reports. Hence, death rates from tables published in these papers should not be compared with those from official Federal reports for the year 1949 and thereafter without a full understanding of the differences in the detailed terms included under these two general headings.

[3] Note that these time series have been carried 2 years farther than those in reference (*1*).

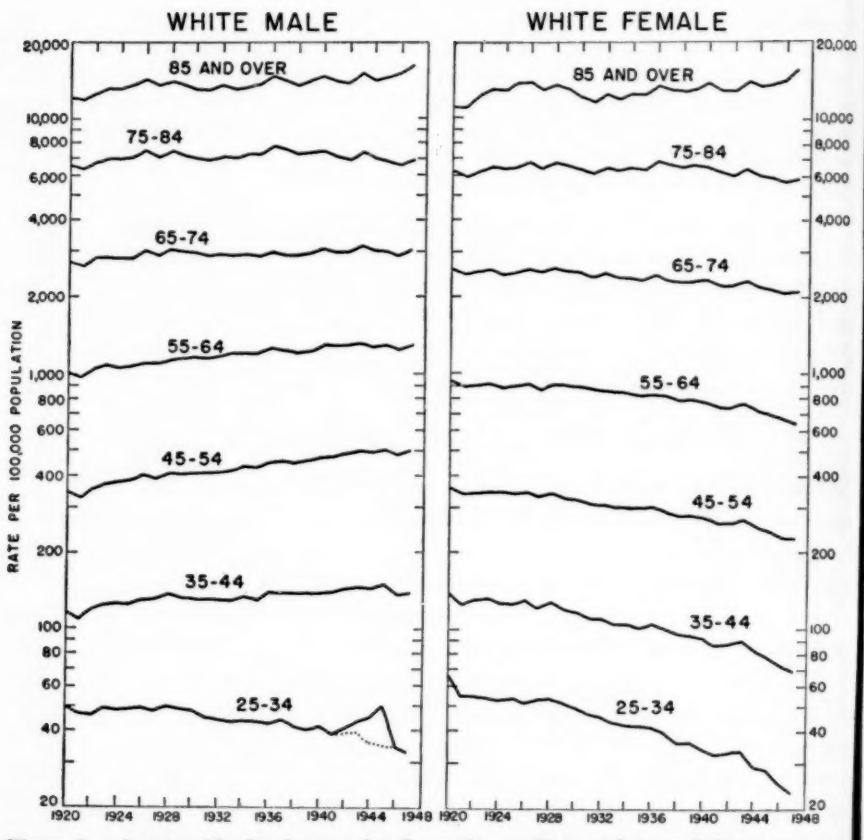


**Figure 1. Age-specific death rates for the major cardiovascular-renal diseases among white males and females: United States Death Registration States, 1920–47.**

period 1920–1933 owing to the admission of several large Southern States. However, since 1933 there has been no clear-cut upward trend at any age among the nonwhite males and females.[4]

Two series of death rates for males are shown in these graphs for the war years 1942–1947, for the age group 25–34 years. The lower of the two is based on estimates of the population that include men in the armed services overseas, while the upper is the rate published in the official vital statistics reports which is based on the population exclusive of the men overseas. All deaths that occurred overseas are excluded in both rates. However, relatively few deaths from chronic disease took place among the men while out of the country. In 1945, for example, the number of deaths among members of the

[4] There is a curious tendency for the nonwhite mortality to decline more in the two age groups over 75 years than in the next younger age group. This may possibly be a result of misstatement of age or lack of knowledge of age which is known to be especially common among the older Negroes. A complete explanation based on this supposition would require not only information on accuracy of age statement on both the death certificate and the census record but also an examination of changes in the amount and direction of the errors over the last 25 or 30 years.

armed forces overseas from the causes with which we are concerned was not over 550 at all ages. In the age group 25–34 years, the exclusion probably amounted to less than 3 percent of all male cardiovascular-renal deaths. Consequently, the rate based on the male population including those overseas is more comparable with the rates for peacetime years.

## Race-Sex Groups Compared at Each Age

To facilitate the comparison of trends between males and females and between white and nonwhite persons, the rates for the four major subgroups have been brought together in figure 3 in separate graphs for each age group beginning at 25 years of age. Again, the vertical scale is logarithmic.

One of the most striking features of these graphs is not a matter of trend at all. It is the change with age in the ratio of the white to the nonwhite death rate. It is clear that the marked excess in nonwhite mortality in the youngest age group is diminished with increasing

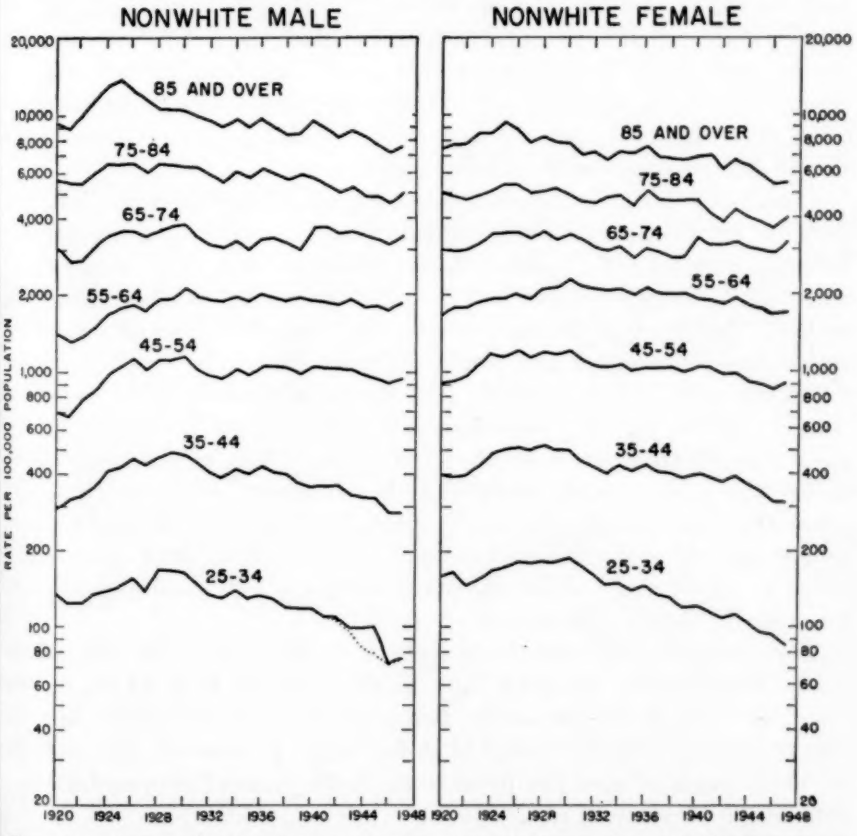


Figure 2. Age-specific death rates for the major cardiovascular-renal diseases among nonwhite males and females: United States Death Registration States, 1920–47.



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age until at 65–74 years of age the white-male time series is hardly distinguishable from the two nonwhite series. At 75 years and above, the white mortality for both sexes is clearly higher. This reversal is evident in the United States life tables for the white and Negro [5] populations in 1939–1941 (*3*). The average future lifetime for persons arriving at their 35th and 75th birthdays is shown below:

*Average Future Lifetime in Years: United States, 1939–1941*

| | | *White* | *Negro* |
|---|---|---|---|
| Age 35 | Males | 34. 36 | 28. 48 |
| | Females | 37. 70 | 30. 71 |
| Age 75 | Males | 7. 17 | 8. 17 |
| | Females | 7. 92 | 9. 81 |

Since this reversal appears in mortality from all causes combined, it is obviously not to be explained as solely a matter of poorer diagnosis on death certificates for nonwhite persons. However, it is possible that under-registration of deaths or inaccuracy of age information for the older Negroes on the death certificate, or the census record, or both, could account for the peculiarity. Although there is no definitive evidence on this point, it is believed that the death rates for all causes among the Negroes over 65 years of age may be actually no lower than those for whites. Hence, the fact that cardiovascular-renal rates are lower for the nonwhite population at advanced ages should not be considered of great significance.

A point of undoubted significance, on the other hand, is that the trend of cardiovascular-renal mortality among white males does not follow the pattern of the other three race-sex groups. If we pay chief attention to the last 20 years of the time series, that is, the years 1928 to 1947, the slopes of the three curves for white females and nonwhite males and females are not much different from one another in the "working ages," 25–64 years. On the whole, these three seem to show a gradual decline, with the white female series dropping slightly more rapidly than the other two. But the death rate among white males has a downward slope that is definitely less steep than the other three at 25–34 years, no downward slope at all at 35–44 years at an age when the other three are clearly falling, and an upward trend at 45–64 years when the other three are still declining, though less rapidly than at the earlier ages.

The contrast between the direction of the curves for the white males and females between 35 and 65 years is very marked. In 1920, the difference between the two sexes was negligible while in 1947 the white male rate exceeded that for white females by 100 percent at 35–44 years of age, 120 percent at 45–54 years of age, and 97 percent at 55–64 years of age.

[5] The life tables were shown separately for Negroes and other races, but Negroes constitute about 95 percent of all nonwhite persons in the United States.

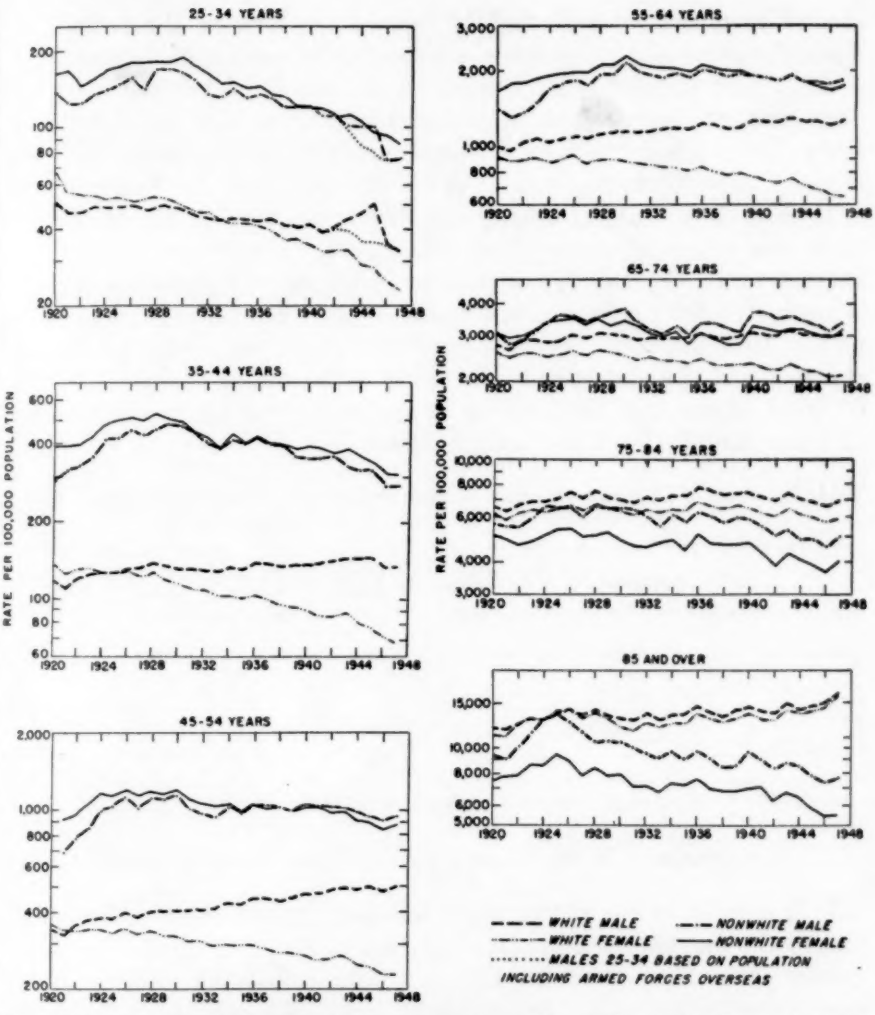


**Figure 3. Age-specific death rates for the major cardiovascular-renal diseases in four population groups: United States Death Registration States, 1920–47.**

By comparison, the sex differences in the trends of nonwhite cardiovascular-renal mortality in these same ages are trivial. Although there was some excess in the mortality among nonwhite females as compared with nonwhite males in the earlier years of the period under study, by 1940 this had completely disappeared in the age group 45–64 years. At ages 25–44 years it disappeared and then reappeared so that in 1947 the rate for females was slightly higher than for males.

Up to age 75, the death rate for white females is the only one that has shown some improvement in every age group. Above that age, the sex differences seem to become distinctly less important in

the white mortality and slightly more important in the nonwhite. Both the nonwhite rates show a tendency toward a decline at ages over 75. If this tendency continues, there will be in the future an even greater excess of white over nonwhite mortality in the oldest age groups. Owing to the dubious accuracy of the records for persons at these ages, the importance of this excess is difficult to determine.

Table 3 shows the net change that has taken place in the mortality from this group of causes from one age-race-sex group to another. In this table, the average mortality in the 3-year period, 1945–47, is compared by means of ratios to the average mortality in the 3-year period, 1927–29, taken as a base period.[6] Here the contrast between the increase that has occurred among white males between 35 and 65 years of age and the decrease at the same ages among all females and nonwhite males is particularly clear.

**Table 3.** *Ratio of death rate for major cardiovascular-renal diseases in the period 1945–47 to the corresponding rate in the period 1927–29*

| Age (years) | White males | White females | Nonwhite males | Nonwhite females |
|---|---|---|---|---|
| 25–34 | [1] 0.699 | 0.486 | [1] 0.472 | 0.511 |
| 35–44 | 1.047 | .599 | .645 | .636 |
| 45–54 | 1.240 | .711 | .866 | .751 |
| 55–64 | 1.130 | .753 | .968 | .839 |
| 65–74 | .992 | .835 | .924 | .897 |
| 75–84 | .925 | .887 | .756 | .745 |
| 85 and over | 1.104 | 1.110 | .688 | .694 |

[1] Death rates for 1945–47 based on population including armed forces overseas.

## Comparison With Mortality for "All Other Causes"

It is natural to ask at this point whether the variation in the trend among the four race-sex groups at any one age is characteristic of other causes of death as well as those we have called the major cardiovascular-renal diseases. In particular, it would be of interest to know whether the slope of the trend of death rates for other causes shows the same peculiarity among white males as has just been observed for chronic diseases of the heart, arteries, and kidneys.

In general, the data of figure 4 and table 4 show that this departure of the white male trend from that for the other three groups does not occur in mortality from all other causes combined. The mortality from all other causes among white females is declining more rapidly than it is among white males, but in none of the four groups is there an increase as there is in the white male mortality from the cardiovascular-renal diseases. In the white population, the contrast between the sexes is very much greater for the circulatory and kidney diseases than it is for the other causes of death. Figure 4 shows only three of

[6] The reason for selecting this base period rather than an earlier one is the shift in the trend of nonwhite mortality that occurred at about this time.

the seven age groups being considered; however, table 3 shows the amount and direction of net change that has taken place in each age, race, and sex group relative to the base period selected, 1927–29. These figures may be compared with those in table 3.

Table 4. *Ratio of death rate for all other causes in the period 1945–47 to the corresponding rate in the period 1927–29*

| Age (years) | White males | White females | Nonwhite males | Nonwhite females |
|---|---|---|---|---|
| 25–34 | 0.501 | 0.375 | 0.475 | 0.414 |
| 35–44 | .555 | .498 | .604 | .504 |
| 45–54 | .670 | .617 | .762 | .585 |
| 55–64 | .781 | .664 | .845 | .647 |
| 65–74 | .791 | .688 | .776 | .640 |
| 75–84 | .758 | .673 | .528 | .449 |
| 85 and over | .806 | .742 | .398 | .334 |

## Sex Differences in the White Mortality Trend

Examination of the 1930–1947 data for the three main groups of diseases making up the major cardiovascular-renal diseases shows that the difference in mortality trends between white males and white females is greatest for all forms of heart diseases and somewhat less marked but significantly different for nephritis. The sex differential in trend in the death rates for intracranial lesions of vascular origin is not sufficient to be of any consequence.

The death rates for heart disease (all forms) have increased greatly among white males in the ages 35 to 64, while the corresponding rates for white females have been declining. The pattern of sex differences in mortality trends by age differs somewhat with the various specific forms of heart disease. For example, the death rate for diseases of coronary arteries and angina pectoris has increased among females as well as among males in every age group. However, in every case, except for the oldest age group, 85 years and over, the rate of increase in the death rate for white males has been much greater than for white females. The differences observed in the male and female trends for coronary diseases and angina pectoris are of particular significance because of the large frequency of deaths from these causes, and because mortality from coronary diseases and angina pectoris is much higher among males than among females.

The nephritis death rate for white males is not decreasing as fast as it is for white females. This is particularly true in the age groups 25–64 years, considered in this study. One reason that might be suggested to account for these differences in the rate of decline is the change in comparability of chronic nephritis statistics due to the 1938 revision of the International List of Causes of Death. In this revision, terms such as cardiorenal diseases and cardiovascular-renal diseases were transferred from a heart disease rubric to a nephritis

category. This change in classification certainly altered the trend of nephritis and heart mortality. However, it should not affect the comparison of the trend of the death rates for the two sexes, unless the proportion of conditions reported as cardiorenal or cardiovascular-renal among males differs substantially from that among females. Data on this point are not available, but it does not seem likely that the change in statistical procedure because of the International List revision would account for the observed sex differences in the rate of decline in the death rate for nephritis or for the divergence in the trends of male and female mortality from heart disease.

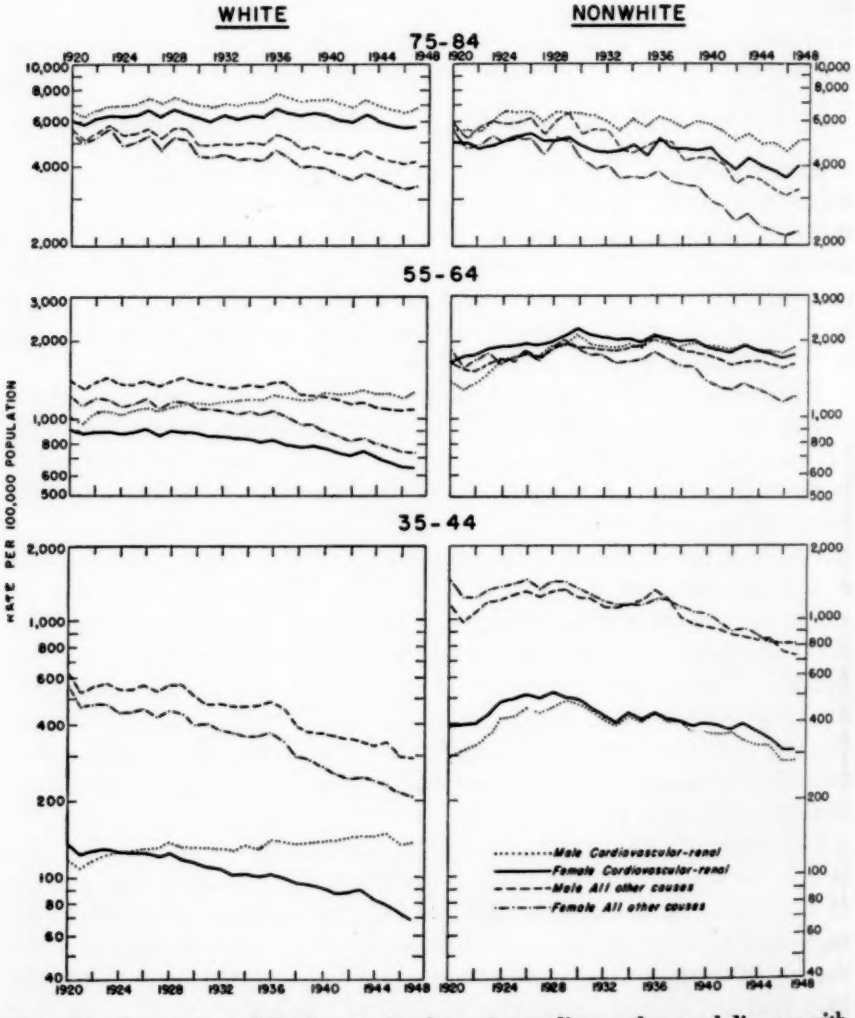


**Figure 4. Comparison of death rates for the major cardiovascular-renal diseases with death rates for all other causes combined: United States Death Registration States, 1920–47.**

Data for England and Wales show very much the same picture, namely, that the death rate for the major cardiovascular-renal diseases is declining faster among females than among males. However, in England and Wales the death rate for males is also declining in the age groups 35 to 44 years, whereas in the United States white male mortality is increasing in every age group from 35 through 64 years.

Of the various problems raised in the analysis of mortality for these Statistical Studies of Heart Disease, that of the increasing risk of death from the major cardiovascular-renal diseases among white males between the ages 35 and 64 years is the most challenging. Because the analysis has been based upon age-specific death rates, the changes cannot be explained as an effect of the aging population, and, in fact, there does not seem to be any good explanation which accounts for an upward trend in the death rate for these diseases among white males while the corresponding rates for white females are going down. The increases in male mortality rates appear to be occurring in the most productive working ages. If they represent true trends, they have serious health, economic, and social implications. For this reason, the problem is one that must definitely be investigated further.

## Summary

Death rates specific for age, race, and sex for the major cardiovascular-renal diseases as a group are examined in a study of trend of mortality from these causes in the United States from 1920 to 1947. The outstanding fact to which attention is directed is the increase in cardiovascular-renal mortality among white males in the ages 35–64 years, in contrast to the marked reductions in the same age groups occurring among white females and, to a lesser extent, among nonwhite males and females. It is shown that the death rate among white males in the working ages is not increasing for all other causes of death combined. The contrast between the trend for white males and females is most marked for diseases of the heart, slightly less so for chronic nephritis, and inconsequential for intracranial lesions of vascular origin.

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# Graduates From Undergraduate Sanitary Engineering Courses in the United States

By Arthur P. Miller*

Since 1924, the Public Health Service has presented four studies pertaining to undergraduate sanitary and public health engineering education in the United States. The first three (*1*, *2*, *3*) discussed both the curricula and the number of persons successfully completing prescribed work. The last one (*4*) was concerned only with an analysis of the curricula in 29 institutions.

This study brings together the available data on the number of persons who have completed work in sanitary and public health engineering from 1889 through 1950, but does not include a discussion of curricula.

As the names of institutions giving work of this description were not assembled in any one document, it was necessary to compile a list of them from college and university catalogues and from publications of the Office of Education, the Engineers' Council for Professional Development, and the American Public Health Association. Full use was made, also, of the information contained in prior Public Health Service publications on this subject.

To assure that no sources of information were overlooked, those universities and colleges shown in the September 30, 1949, report of the Engineers' Council for Professional Development as having accredited civil engineering courses were circularized. As sanitary engineering courses are usually within the jurisdiction of civil engineering schools, this action was thought to be sufficient to obtain information on any sanitary engineering curriculum not previously known.

To a certain degree, inclusion or exclusion of an institution within the scope of this survey was arbitrary. A review of catalogues showed that some colleges offered definitely prescribed sanitary engineering options; others indicated the availability of a sequence of courses in sanitary engineering without specifying that they comprised an optional course; still others set forth enough courses to enable the student to obtain an adequate education in sanitary engineering if the proper ones were elected. In the end, much dependence was placed upon the opinions of the correspondents at the various institutions as to whether their data on sanitary engineering graduates should be used in this summary. This is not a definitive method of selection,

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**Table 1.** *Number of graduates from undergraduate courses in sanitary engineering in the United States—1889–1950*

| College | Year | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1889 | 1890–99 | 1900–1909 | 1910–19 | 1920–24 | 1925–29 | 1930–34 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 |
| Alabama Polytechnic Institute | | | | | | 16 | 29 | 3 | 7 | 6 | 10 | 3 | 8 | 3 | 0 | 7 | 3 | 1 | 3 | 4 | 7 | 9 | 10 |
| Alabama, University of | | | | | | | | | | | | | | | | [1]3 | 3 | 0 | 0 | 3 | 1 | 0 | 3 |
| California, University of | | | 49 | 20 | 9 | 14 | 31 | 19 | 12 | 8 | 13 | 9 | 15 | 8 | 12 | 9 | 4 | 3 | 4 | 8 | 20 | 16 | 12 |
| Carnegie Institute of Technology | | | | [2]7 | 1 | | | | | | | | | | | | | | | | | | |
| Case Institute of Technology | | | | | | | | 5 | 3 | 3 | 2 | 5 | 3 | 5 | 5 | 4 | 9 | 6 | 0 | 2 | 1 | 4 | 4 |
| Columbia University | 2 | 0 | [3]0 | (4) | 0 | [5]1 | | | | | | | | | | | | | | | | | |
| Cornell University | | | 1 | 49 | 3 | 4 | 12 | 3 | 1 | 0 | 1 | 3 | 1 | 1 | 0 | 4 | [6]1 | 0 | 2 | 1 | 1 | 0 | 2 |
| Florida, University of [7] | | | | | | | | | | | | | | (1) | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| Do.[8] | | | | | | | | | | | | | | | | | | | (1) | 0 | 2 | 2 | 8 |
| Georgia Institute of Technology | | | | | | | | | | | | | | | | | | | [1]1 | 6 | 3 | 4 | 8 |
| Harvard University | | | | 15 | [9]8 | 1 | | | | | | | | | | | | | | | | | |
| Illinois, University of | | 4 | 23 | 54 | 13 | 24 | 8 | 1 | 3 | 1 | 4 | 7 | 11 | 8 | 5 | 0 | 8 | 20 | 2 | 4 | 7 | 6 | 2 |
| Iowa, State University of | | | | | 10 | 48 | 24 | 5 | 3 | 10 | 5 | 6 | 8 | 5 | 6 | 8 | 0 | 0 | 0 | 4 | 2 | 6 | 17 |
| Kansas, University of | | | | 4 | 8 | 5 | 8 | 1 | 2 | 2 | 0 | 6 | 4 | 2 | 2 | 2 | 0 | 0 | 0 | 4 | 6 | 12 | 6 |
| Kentucky, University of | | | | | | | | | | | | | | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 1 |
| Lafayette College | | | | | | | | | | | | | | | | | | | | | | (1) | 0 |
| Lehigh University | | | | | | | | | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | (8) |
| Louisiana State University | | | | | | | | | | | | (1) | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 |
| Maine, University of | | | | | | 5 | 29 | 5 | 6 | 2 | 1 | 4 | 1 | 2 | 4 | 4 | 3 | 0 | 0 | 6 | 4 | 3 | 5 |
| Manhattan College | | | | | | | | | | | | 15 | 9 | 6 | 9 | 13 | 14 | 3 | 11 | 21 | 18 | 23 | 25 |
| Massachusetts Institute of Technology [7] | | | | | | | 2 | 2 | 4 | 2 | 0 | 0 | 0 | 0 | 2 | (8) | | | | | | | |
| Do.[8] | | 25 | 48 | 129 | 19 | 15 | 18 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | [6]1 | 2 | | | | | | |
| Do.[10] | | | | | | | | | | 8 | 10 | 7 | 1 | 2 | 4 | 3 | 0 | 1 | 0 | 3 | 4 | 2 | 3 |
| Michigan College of Mining and Technology | | | | | | | | | | | | | | | | | | (11) | 0 | 11 | 10 | 10 | 27 |
| Michigan State College | | | | | | | 13 | 5 | 4 | 1 | 2 | 3 | 3 | 6 | 5 | [6]0 | | | (12) | 0 | 0 | 3 | 7 |
| Michigan, University of | | | | 84 | 44 | 40 | 22 | 4 | 3 | 2 | 3 | 2 | 3 | 5 | 0 | 1 | 1 | 2 | 0 | 6 | 3 | 8 | 10 |
| Minnesota, University of | | | | | | | | | | | | | | | | (1) | 0 | 0 | 0 | 0 | 1 | 2 | 1 |
| Mississippi State College | | | | | | | | | | | (1) | | | | | 88 | | | | | | | 28 |
| Missouri School of Mines and Metallurgy | | | | | | | 8 | 2 | 2 | 3 | 1 | 2 | 1 | 2 | 3 | 2 | 0 | 0 | 0 | 1 | 4 | 8 | 15 |
| Missouri, University of | | | | | | | | | (1) | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 2 | 4 | 3 | 4 |
| New York University | | | | | | | 4 | 0 | 4 | 8 | 6 | 7 | 7 | 15 | 10 | 7 | 6 | 0 | 0 | 2 | 4 | 4 | 8 |
| Newark College of Engineering | | | | | | | | | | | | | | | | | | (1) | 0 | 0 | 0 | 5 | 6 |
| North Carolina State College of Agriculture and Engineering | | | | | | | 15 | 5 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 0 | (8) | | | | |
| Oklahoma Agricultural and Mechanical College | | | | | | 11 | 16 | 5 | 2 | 0 | [6]1 | | | | | | | | | | [11]1 | 2 | 2 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oklahoma, University of | | | | | | | | | | | | | | | | | | | | (1) | 0 | 1 | 2 | |
| Oregon State College | | | | | | | | | | | | | | | | | | (1) | 0 | 7 | 15 | 34 | 17 | |
| Pennsylvania State College | | | 6 | 56 | 17 | 14 | 28 | 4 | 0 | 2 | 1 | 6 | 7 | 2 | 4 | 0 | 0 | 0 | 0 | 2 | 7 | 1 | 7 | |
| Pittsburgh, University of | | | | 11 | [6]1 | | | | | | | | | | | | | | | | | | | |
| Purdue University | | | | | | | 32 | 4 | 8 | 5 | 3 | 6 | 13 | 3 | 10 | 2 | 0 | 1 | 1 | 1 | 7 | 7 | 8 | |
| Rensselaer Polytechnic Institute | | | | | | | | | | | | | | (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | |
| Rutgers University | | | | | | 3 | 8 | 1 | 3 | 1 | 2 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | |
| Santa Clara University | | | | | | | | | | | | (1) | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 13 | 0 | |
| South Carolina, University of | | | | | | | | | | (1) | 0 | 0 | 2 | 0 | [6]0 | | | | | | | | | |
| Texas, Agricultural and Mechanical College of | | | | | | | | | | | | | 1 | 2 | 1 | 0 | 3 | 1 | 1 | 5 | 7 | 11 | 4 | |
| Texas, University of | | | 1 | 0 | 1 | 1 | 7 | 0 | 3 | 1 | 1 | (8) | | | | | | | (12) | 0 | 3 | 5 | 1 | |
| Tulane University of Louisiana | | | | | | | | | | | | | | | | | | | | | (1) | 0 | 0 | |
| Utah State Agricultural College | | | | | | | | | | | | | | | | | | | | | (1) | 2 | 5 | |
| Virginia Polytechnic Institute | | | | | | | 2 | 2 | 5 | 3 | 9 | 4 | 11 | 6 | 1 | 2 | 0 | 1 | 0 | 4 | 4 | 7 | 15 | |
| West Virginia University | | | | 1 | 1 | 6 | 16 | 7 | 5 | 1 | 2 | 4 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 2 | 5 | |
| Wisconsin, University of | | | | | | | 1 | 2 | 4 | 4 | 3 | 0 | 5 | 5 | 1 | 1 | 3 | 1 | 1 | 2 | 3 | 15 | 7 | |

[1] Option or course first offered.
[2] Course discontinued in 1919.
[3] Course discontinued in 1900.
[4] Course resumed in 1918.
[5] Course discontinued in 1928.
[6] Option or course discontinued.
[7] Public health engineering option.
[8] Sanitary engineering option.
[9] Course discontinued in 1922.
[10] These students completed work equivalent to the requirements of the sanitary engineering option.
[11] Elective sequence started.
[12] Option resumed.

but in the absence of any applicable standards recourse was made to it.

Data on the number of graduates from sanitary engineering curricula for the years 1889–1938 have been published previously (*3*). The principal purpose of this study was therefore to extend these data through 1950. During work on another study, it was found as a result of reviewing old college and university records that some of the figures for the years 1889–1938 were wrong. Corrections, therefore, have been made in the statistical summary presented in table 1. The information for the years prior to 1935 has been grouped in 10- and 5-year periods after corrections were made.

The number of sanitary engineers graduating from available undergraduate courses has fluctuated each year since 1938. In 1938 (the last year in the author's summary published in 1939) 82 completed the required work. There was then an increase until 1941 which was followed by a decrease until 1947. That year the trend again started upward, and in 1950 there were 287 graduates.[1]

If the number of graduates for each 5-year period ending with a census year is compared to the population calculated for the mid-year in the respective 5-year period, an increase in the "production" rate is demonstrated.

There are today more colleges and universities giving work in sanitary engineering than there were 12 years ago (1938) and also, on the average, more men are completing their work in this area than in 1938. The 21 institutions having available courses in sanitary engineering for the full 5-year period 1934–38 graduated during that period 414 men, or 3.9 per institution per year. (The minimum per institution was zero and the maximum 19.) For the 1946–50 period, the number graduated from 33 institutions was 821, or 5.0 per institution per year. (In this period the minimum per institution was also zero and the maximum 34.)

**Table 2.** ***Number of graduates per million population per year***

| Census year | Number of graduates in 5-year period ending with each census year | Year for which population calculated | Millions of population | Number of graduates per million population per year |
|---|---|---|---|---|
| 1900 | 35 | 1898 | 73 | 0.10 |
| 1910 | 152 | 1908 | 88 | .35 |
| 1920 | 423 | 1918 | 102 | .83 |
| 1930 | 369 | 1928 | 119 | .62 |
| 1940 | 850 | 1938 | 129 | 1.32 |
| 1950 | 1,271 | 1948 | 146 | 1.74 |

Requirements for completion of sanitary engineering training vary

[1] As the number of graduates yearly for the period 1939–1949 from Mississippi State College was not available, the total number, 88, has been prorated over the 11 years for statistical purposes.

greatly. In one university, the student is expected to successfully complete the following courses:

*Institution A (two-semester year)*

| | Semester hours |
|---|---|
| Sewage analysis | 2 |
| Sewage treatment | 2 |
| General biology | 4 |
| Public water supplies | 4 |
| Water analysis | 2 |
| Limnology | 3 |
| General bacteriology | 4 |
| Sewerage and sewage treatment | 4 |
| Water purification | 2 |
| Stream pollution | 2 |
| Municipal plant management | 2 |
| Industrial waste and municipal refuse treatment | 2 |
| Semester hours | 33 |

On the other hand, at another institution the requirements include only the following courses:

*Institution B (three-term year)*

| | Term hours |
|---|---|
| Sewerage design | 3 |
| Water supply engineering | 3 |
| Sanitary bacteriology | 4 |
| Sewage treatment | 3 |
| Municipal and rural sanitation | 4 |
| Term hours | 17 |
| Equivalent hours on a two-semester basis | 11.3 |

Such difference of opinion as to what is necessary for the training of a sanitary engineer makes it difficult to accomplish a statistical summary of this kind. There is lacking for this purpose a screen of curriculum adequacy. The absence of such a tool involves the investigator in decisions which may be subject to criticism. It would therefore be very useful to have a generally acceptable minimum of course content to apply to each student's academic accomplishment to determine the suitability of including him in future similar tabulations. This would make the data more meaningful.

The corrections in the data for the years prior to 1939 were made possible by reviews of college and university records by Assistant Sanitary Engineer (R) Walter A. Lyon during visits to the institutions involved. Professors at the various institutions assisted in preparing this tabulation by collecting and supplying many of the data used. To all who assisted, the author expresses his appreciation.

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# Hazards of Shoe-Fitting Fluoroscopes

By Willard W. Van Allen, B.Sc.*

Radiation hazards associated with the use of X-ray shoe-fitting machines have recently become a matter of great concern to both roentgenologists and departments of public health. This concern has been expressed in professional journals and in popular articles appearing in nontechnical publications as well as by the adoption of regulatory codes in several States and cities. As used in the ordinary shoe store, shoe-fitting fluoroscopic equipment is operated by persons who have no knowledge of roentgen characteristics and no training in X-ray technique. Moreover, there is no way of imposing any control over the shoe customer who shops around from store to store. As a result, it is important to know just what radiation hazards are present in shoe stores which use fluoroscopic equipment and to what extent the hazard can be automatically controlled.

Shoe-fitting fluoroscopes present two distinct radiation problems: (1) the direct radiation received by the customer, and (2) the radiation received by the shoe-store personnel. In the first case, radiation exposure is brief, but relatively intense, with direct radiation centered upon one or both feet, and a certain amount of secondary radiation distributed over the lower part of the body. Conversely, clerks and other personnel in the store are subject principally to secondary radiation in varying quantities, depending on their position and habits during examinations. Frequently, clerks expose themselves unnecessarily to direct radiation as well.

## The Survey

In an effort to determine the radiation hazards surrounding shoe-fitting installations, the author obtained the cooperation of merchants in suburban Washington, and proceeded to examine several shoe-fitting fluoroscopes and to measure their radiation characteristics. All of the fluoroscopes examined were equipped with an automatic switch for terminating the exposure after a predetermined length of time which varied from 10 to 30 seconds. Some of the machines were equipped with a selector switch with three positions (marked "men," "women," and "children"), presumably permitting alteration of milliamperage or kilovoltage. Others, however, were designed for operation at a single exposure rate.

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In the accompanying table, the radiation characteristics of three typical machines are summarized. The total radiation to which a person's foot is subjected during a shoe-fitting examination (at maximum exposure) is indicated as well as the dosage rate in roentgens per second. Considering the very short target-foot distance in these machines, amounting to approximately 6 inches, the high dosage rates indicated are to be expected. Although a thin plate of aluminum is normally interposed between tube and foot in order to control the dosage somewhat, plates have been found in worn-through condition or completely removed.

*Radiation characteristics of shoe-fitting fluoroscopes*

| Machine | Automatic time limit (seconds) | Maximum radiation within time limit—roentgens | | | Radiation rate roentgens per second | | |
|---|---|---|---|---|---|---|---|
| | | Men | Women | Children | Men | Women | Children |
| A | 30 | 23.0 | 19.0 | 15.0 | 0.77 | 0.63 | 0.50 |
| B | 10 | 12.4 | 10 | 5.8 | 1.24 | 1 | .58 |
| C | 17 | 4.5 | 4.5 | 4.5 | .26 | .26 | .26 |

In all cases, secondary radiation through the top and viewing ports, the two sides, and back was found to be negligible. However, a cone of radiation does emanate from the foot recess which is roughly proportional in the different machines to the dosage rates shown in the tabulation. On the average, this radiation was about 20 milliroentgens per minute at a distance of 3 feet from the foot recess when there is no foot in position, and from two to four times this amount when a foot is being examined. Thus, the secondary radiation immediately behind the customer may be as much as 50 to 100 milliroentgens per minute. Since the maximum permissible radiation dosage rate is defined as 300 milliroentgens per week,[1] it is clear that this safety limit could easily be exceeded by a clerk who regularly takes up a position in this region after some 20 to 40 fittings requiring only 10-second exposures.

In all probability, exposure to secondary radiation of this magnitude is unlikely in actual practice, since the control panel is so located that the clerk cannot operate the machine while standing in the region of secondary radiation. However, several store managers pointed out that some clerks make a practice of kneeling down beside a customer (especially with a child) in order to hold him or his foot in position. Where this occurs, the clerk exposes himself to secondary radiation over almost his entire body. Furthermore, the clerk who actually holds the customer's foot during the exposure is subjecting his hand to the same high degree of radiation as the customer's foot receives; such an exposure, repeated many times a day, cannot fail in time to result in serious injury.

[1] Handbook 41. Medical X-ray Protection Up to Two Million Volts. U. S. Department of Commerce, National Bureau of Standards, 1949, 43 pp.

## Control Measures

In many parts of the country, health authorities have devised measures for reducing the radiation hazards inherent in shoe-fitting fluoroscopes. The city of New York, for example, requires that the machines be equipped with exposure control devices to limit the exposure sustained by a shoe customer's foot to 2 roentgens. A time switch in these machines is set for 5 seconds, and appropriate milliamperage adjustments are made to limit the dosage to 2 roentgens for the 5-second exposure (see appendix).

Other safety measures are possible as well. The fluoroscope can be placed against a dead wall so that there is no room for anyone other than the customer on that side of the machine. Thus, there will be less chance that others, including clerks, will be exposed to secondary radiation. Finally, care should be taken to see that both the aluminum foot-plate filter and the lead glass between the screen and the viewing ports are intact and in place at all times. The lead glass especially should not be replaced with ordinary plate glass, or removed entirely, as so often happens.

Unfortunately, there is no way to prevent customers from going from one store to another and receiving one or more exposures in each. The city of New York requires the display of warning cards advising against more than three exposures a day or twelve per year. It should be noted, however, that this limit of three exposures per day is predicated on a maximum radiation dosage of 2 roentgens, which is considerably lower than any of the dosages actually encountered in our survey (see table).

It is most important that shoe-store operators be educated about the X-ray equipment which they use in their business. All the merchants approached for permission to study their equipment, with one exception, were eager to cooperate and anxious to be informed of the findings. The one exception stoutly maintained that "there couldn't be any question of danger, since there were no X-rays in the machine anyway—it was just a label."

## APPENDIX

### New York City Sanitary Code

***Amendment to Regulations***

At a meeting of the Board of Health of the Department of Health held February 10, 1948, the following resolution was adopted: Resolved, That new regulations to be known as "Regulations Governing the Operation and Maintenance of Apparatus Used for Shoe Fitting Fluoroscopy," and relating to Section 107a of the Sanitary Code of the City of New York, be and they are hereby adopted to read as follows, effective March 1, 1948:

Regulation 1. Information to be furnished by the applicant. Every application for a permit to maintain or operate one or more machines used for shoe-fitting fluoroscopy shall be made in writing on an official blank to be furnished by the Health Department and must contain the following information:

Address of premises and parts of building where shoe-fitting fluoroscopy machines are located.

Name and address of applicant.

Regulation 2. Protection of operators and attendants. The equipment shall be so constructed that the dosage rate in any region which may be occupied by operators and attendants does not exceed 12.5 milliroentgens per hour. Means shall be provided to prevent operators or attendants from exposing the hands or any other parts of the body to the useful beam. The equipment shall be so located and oriented that scattered radiation from the opening where the feet are placed is not directed toward occupied regions unless suitable protecting screens are interposed.

Regulation 3. The maximum permissible dose per exposure ("exposure" being defined as a single viewing of one pair of shoes on the feet) shall not exceed 2 roentgens. Each machine shall be provided with an automatic timer set to terminate the exposure when said limit of 2 roentgens for such exposure has been reached. There shall not be more than three exposures in any one day, and not more than a total of 12 exposures in 1 year. The machine shall not be used for any purpose other than the examination of the feet with shoes on.

Regulation 4. Meters, controls and safeguards.—Meters and controls shall be provided in order to maintain the milliamperage and kilovoltage within the proper limits. The X-ray tube shall be provided with a filter equivalent to not less than 1.0 mm. aluminum. Safeguards shall be provided to prevent any use of the equipment by persons other than a qualified operator. The permit holder shall take proper means satisfactory to the Department of Health for instructing a salesman in respect to the operation of the machine as to the potential hazards to himself and his customers and the necessity for his having an annual medical examination including blood count.

Regulation 5. Warning sign.—Each machine shall be provided with a conspicuously located sign warning the customer that repeated exposure to X-ray may be harmful. The sign should measure at least 7½ inches by 4½ inches, be placed in a conspicuous position, and contain the following warning in capital letters at least ⅜ of an inch high:

"REPEATED EXPOSURE TO X-RAY MAY BE HARMFUL, INCLUDING THE EXPOSURE OF HUMAN FEET IN SHOES. FLUOROSCOPIC EXAMINATIONS FOR SHOE FITTING SHALL BE LIMITED TO THREE EXPOSURES IN ANY ONE DAY, AND SHALL BE LIMITED TO NOT MORE THAN A TOTAL OF 12 EXPOSURES IN ONE YEAR."

Regulation 6. Permit not transferable.—A permit is issued to a particular person and for one or more machines at a given location and is not valid for use by any other person or in any other place than stated in the permit. All permits issued under section 107a shall expire March 31 annually.

Regulation 7. Revocation of permit.—A permit issued hereunder may be revoked at the discretion of the Board of Health for violation of the Sanitary Code or of any regulation adopted thereunder for such other cause as may be deemed sufficient by the Board of Health.

# Incidence of Disease

*No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring*

## UNITED STATES

### Reports From States for Week Ended March 3, 1951

In collaboration with the Influenza Information Center, National Institutes of Health, the following report has been prepared.

The number of reported cases of influenza for the current week was 10,675 compared with 6,149 for the previous week and 13,967 for the same week last year.

New York City reported 270 cases of influenza for the current week compared with 49 and 23 cases for the preceding 2 weeks, respectively. No significant increase in deaths from all causes has occurred over the past 3-week period. Philadelphia reported 1,191 cases with 12 deaths from influenza for the week ended March 3 compared with 528 cases and 3 deaths for the previous week. The number of deaths from all causes in Philadelphia for the current week was 794 compared with 594 and 536 deaths for the previous 2 weeks. Boston also reported an increase in deaths from all causes, 365 being reported during the current week compared with 285 and 261 for the previous 2 weeks. Cities in the New England area reported an increase of 35 percent in deaths from all causes for the current week compared with the 5-year median, while the cities in the Middle Atlantic States reported a 20 percent increase.

Dr. E. C. Curnen of the Collaborating Laboratory of the Influenza Study Program, Yale University, School of Medicine, reports that acute respiratory infections have been unusually prevalent since early February in many parts of Connecticut. Most of the illnesses have been relatively mild with constitutional as well as respiratory symptoms and a fever which lasted, on the average, for 48 hours. Specimens of serum obtained from seven representative patients in two different university groups have shown a significant increase in antibodies against the FM–1 strain of influenza A-prime virus as measured by the hemagglutination inhibition technique. Among the same patients, significant but less marked increases in titer against the PR–8 strain of influenza virus have also been noted. The State of Connecticut reported 942 cases of influenza for the current week as compared with 35 for the week ended February 24 and 2 for the week ended February 17.

Dr. D. L. Seckinger, District of Columbia Director of Public Health, has reported an outbreak of an influenzalike infection among children in an institution. The first case appeared about 2 weeks ago. In the group of 120 children, 40 have been affected. Symptoms consist of malaise and moderate fever lasting about 5 days. Throat washings are being obtained for isolation of virus.

Dr. John Dingle of the Collaborating Laboratory of the Influenza Study Program, Western Reserve University, Cleveland, reports that illnesses resembling influenza clinically have occurred for the first time in a group of Cleveland families, which have been under continuous observation for more than 2 years. Between February 14 and February 28, there have been 24 such illnesses in a population of 250 individuals. However, the total number of illnesses has not increased in this population over the preceding month despite the appearance of influenzalike illnesses. Influenza virus has been recovered from five of these patients. Immunologic identification of three of the strains through use of chicken antiserum indicates that the strains are in the A-prime group, most closely resembling the 1950 strain but also the FM–1 strain. Similar illnesses have been seen by practicing physicians in the university hospitals since February 20.

Dr. W. L. Halverson, California Director of Public Health, reports that the mild upper respiratory syndrome, previously prevalent in central and northern California, has extended into the southern part of the State. The regional laboratory at Berkeley reports the serological diagnosis by complement fixation reaction of 58 cases of influenza having onset between January 23 and February 14. Most of these cases occurred in the northern part of California. A later report reveals that 93 paired bloods in a group of 255 showed serological evidence of A-prime influenza. Eighty-five of the positive bloods were from nine counties in central California, and eight from four southern counties.

The Sixth Army Medical Laboratory reports that of 16 paired sera from cases in California military installations, 1 showed a rise in titer against type A, 13 against A-prime, and 2 against B. Some sera, in addition to rises against A-prime, also showed an increase in titer against type A.

The Division of Preventive Medicine, Office of the Surgeon General of the Army, reports that during February, 126 of 230 paired serum specimens from Fort Monmouth, N. J., showed a rise in hemagglutination inhibition titer. Eleven of these were against type A, 113 against A-prime, and 2 against B. In the same period, 58 of 306 sera from Fort Dix, N. J., showed a rise in hemagglutination inhibition titer. Four of these were against type A, and 54 were against A-prime strain.

## *Comparative Data For Cases of Specified Reportable Diseases: United States*

[Numbers after diseases are International List numbers 1948 revision]

| Disease | Total for week ended— | | 5-year median 1946–50 | Seasonal low week | Cumulative total since seasonal low week | | 5-year median 1945–46 through 1949–50 | Cumulative total for calendar year— | | 5-year median 1946–50 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mar. 3, 1951 | Mar. 4, 1950 | | | 1950–51 | 1949–50 | | 1951 | 1950 | |
| Anthrax (062) | 2 | ------ | ------ | (1) | (1) | (1) | (1) | 15 | 2 | 11 |
| Diphtheria (055) | 88 | 144 | 199 | 27th | 3,772 | 5,761 | 8,370 | 865 | 1,490 | 2,012 |
| Encephalitis, acute infectious (082) | 19 | 18 | 10 | (1) | (1) | (1) | (1) | 104 | 107 | 66 |
| Influenza (480–483) | 10,675 | 13,967 | 4,146 | 30th | [2]50,998 | 50,718 | 50,718 | [3]36,456 | 40,134 | 40,134 |
| Measles (085) | 16,848 | 9,584 | 18,962 | 35th | [2]130,946 | 73,715 | 120,113 | [3]102,245 | 54,585 | 93,989 |
| Meningitis, meningococcal (057.0) | 132 | 86 | 91 | 37th | 1,952 | 1,696 | 1,696 | 991 | 782 | 782 |
| Pneumonia (490–493) | 2,875 | 3,118 | ------ | (1) | (1) | (1) | (1) | [3]17,294 | 21,777 | ------ |
| Poliomyelitis, acute (080) | 87 | 81 | 52 | 11th | 33,303 | 42,446 | 25,336 | 1,084 | 972 | 539 |
| Rocky Mountain spotted fever (104) | ------ | 2 | 2 | (1) | (1) | (1) | (1) | 2 | 8 | 6 |
| Scarlet fever (050) [4] | 2,586 | 1,938 | 2,932 | 32d | 36,015 | 32,215 | 47,485 | 20,324 | 15,776 | 23,737 |
| Smallpox (084) | 1 | 1 | 4 | 35th | 15 | 21 | 50 | 7 | 11 | 29 |
| Tularemia (059) | 15 | 20 | 20 | (1) | (1) | (1) | (1) | 129 | 206 | 206 |
| Typhoid and paratyphoid fever (040, 041) [5] | 36 | 45 | 45 | 11th | 3,256 | 3,781 | 3,781 | 341 | 408 | 383 |
| Whooping cough (056) | 1,734 | 2,962 | 2,142 | 39th | 36,449 | 43,996 | 43,996 | 14,847 | 22,460 | 20,136 |

[1] Not computed.
[2] Deduction: Nevada, week ended Feb. 10, 36 cases.
[3] Additions: Measles—Nevada, week ended Feb. 17, 1 case; pneumonia—Nevada, week ended Feb. 17, 10 cases—Alabama, week ended Feb. 24, 73 cases.
[4] Including cases reported as streptococcal sore throat.
[5] Including cases reported as salmonellosis.

## Reported Cases of Selected Communicable Diseases: United States, Week Ended Mar. 3, 1951

[Numbers under diseases are International List numbers, 1948 revision]

| Area | Diphtheria (055) | Encephalitis, infectious (082) | Influenza (480–483) | Measles (085) | Meningitis, meningococcal (057.0) | Pneumonia (490–493) | Poliomyelitis (080) |
|---|---|---|---|---|---|---|---|
| **United States** | **88** | **19** | **10,675** | **18,848** | **132** | **2,875** | **87** |
| **New England** | **1** | | **1,699** | **899** | **3** | **105** | |
| Maine | | | 508 | 2 | | 36 | |
| New Hampshire | | | 166 | 120 | | 3 | |
| Vermont | | | 54 | 217 | 1 | | |
| Massachusetts | 1 | | | 476 | 1 | | |
| Rhode Island | | | 29 | 2 | | | |
| Connecticut | | | 942 | 82 | 1 | 66 | |
| **Middle Atlantic** | **13** | **9** | **409** | **2,177** | **14** | **463** | **13** |
| New York | 7 | 6 | [1] 270 | 775 | 6 | 216 | 9 |
| New Jersey | 1 | 3 | 139 | 479 | 1 | 104 | 1 |
| Pennsylvania | 5 | | | 923 | 7 | 143 | 3 |
| **East North Central** | **4** | **3** | **102** | **3,141** | **19** | **165** | **5** |
| Ohio | | | | 850 | 10 | | |
| Indiana | 3 | 1 | 3 | 157 | | 13 | 2 |
| Illinois | | | 14 | 584 | 3 | 91 | 2 |
| Michigan | 1 | 2 | 85 | 674 | 3 | 61 | 1 |
| Wisconsin | | | | 876 | 3 | | |
| **West North Central** | **4** | **2** | **32** | **927** | **8** | **84** | **6** |
| Minnesota | 2 | | 2 | 91 | 3 | 6 | |
| Iowa | | | | 44 | 1 | 8 | 3 |
| Missouri | 1 | | 1 | 392 | 1 | 3 | |
| North Dakota | | 2 | 6 | 93 | 1 | 62 | |
| South Dakota | | | | 26 | 1 | | |
| Nebraska | | | | 27 | | | 1 |
| Kansas | 1 | | 23 | 254 | 1 | 5 | 2 |
| **South Atlantic** | **24** | **3** | **2,596** | **1,228** | **28** | **586** | **20** |
| Delaware | 1 | | 38 | 54 | | | |
| Maryland | | | 9 | 78 | 2 | 47 | 1 |
| District of Columbia | | | 3 | 49 | | 19 | |
| Virginia | 4 | | 832 | 350 | 5 | 138 | 2 |
| West Virginia | 5 | | 598 | 144 | 1 | 20 | 2 |
| North Carolina | 7 | | | 209 | 6 | | 4 |
| South Carolina | 2 | | 302 | 16 | 4 | 40 | |
| Georgia | 5 | 3 | 814 | 303 | 9 | 322 | 8 |
| Florida | | | | 25 | 1 | | 3 |
| **East South Central** | **10** | | **145** | **409** | **18** | **149** | **3** |
| Kentucky | 4 | | 7 | 171 | 10 | 34 | |
| Tennessee | | | 66 | 53 | 3 | | |
| Alabama | 1 | | | 16 | 3 | 70 | 1 |
| Mississippi | 5 | | 72 | 169 | 2 | 45 | 2 |
| **West South Central** | **28** | **2** | **1,563** | **3,912** | **20** | **999** | **7** |
| Arkansas | 4 | | 613 | 273 | 1 | 72 | |
| Louisiana | 4 | 2 | 739 | 215 | 2 | 83 | 5 |
| Oklahoma | 1 | | 211 | 364 | 3 | 60 | |
| Texas | 19 | | | 3,060 | 14 | 784 | 2 |
| **Mountain** | **1** | | **1,942** | **1,665** | **4** | **185** | **5** |
| Montana | | | 38 | 80 | | | |
| Idaho | | | | 55 | | | |
| Wyoming | | | | 35 | | | |
| Colorado | | | 20 | 883 | 3 | 55 | 4 |
| New Mexico | | | | 51 | | 17 | |
| Arizona | 1 | | 1,853 | 485 | 1 | 113 | |
| Utah | | | | 61 | | | 1 |
| Nevada | | | 31 | 15 | | | |
| **Pacific** | **3** | | **2,187** | **2,490** | **18** | **139** | **28** |
| Washington | 1 | | 705 | 676 | 1 | 2 | |
| Oregon | 1 | | 1,249 | 33 | 2 | 46 | 3 |
| California | 1 | | 233 | 1,781 | 15 | 91 | 25 |
| Alaska | | | 5 | | | | |
| Hawaii | | | 7 | 7 | | | 1 |

[1] New York City only.

*Anthrax:* California, 1 case; New York, 1 case.

## Reported Cases of Selected Communicable Diseases: United States, Week Ended Mar. 3, 1951—Continued

[Numbers under diseases are International List numbers, 1948 revision]

| Area | Rocky Mountain spotted fever (104) | Scarlet fever (050) | Smallpox (084) | Tularemia (059) | Typhoid and paratyphoid fever [1] (040, 041) | Whooping cough (056) | Rabies in animals |
|---|---|---|---|---|---|---|---|
| **United States** | | **2,586** | **1** | **15** | **36** | **1,734** | **128** |
| **New England** | | **215** | | | | **121** | |
| Maine | | 13 | | | | 32 | |
| New Hampshire | | [2] 7 | | | | 8 | |
| Vermont | | 4 | | | | 11 | |
| Massachusetts | | 143 | | | | 42 | |
| Rhode Island | | 10 | | | | 20 | |
| Connecticut | | 38 | | | | 8 | |
| **Middle Atlantic** | | **497** | | **2** | **10** | **240** | **14** |
| New York | | [3] 223 | | | 5 | 93 | 12 |
| New Jersey | | 57 | | | 2 | 61 | |
| Pennsylvania | | 127 | | 2 | 3 | 86 | 2 |
| **East North Central** | | **816** | | **2** | **2** | **257** | **6** |
| Ohio | | 255 | | | | 69 | 2 |
| Indiana | | 64 | | | 1 | 7 | |
| Illinois | | 116 | | 2 | 1 | 12 | 1 |
| Michigan | | 314 | | | | 92 | 3 |
| Wisconsin | | 67 | | | | 77 | |
| **West North Central** | | **140** | | **1** | **3** | **79** | **11** |
| Minnesota | | 32 | | | | 24 | 2 |
| Iowa | | 15 | | | 2 | 12 | 9 |
| Missouri | | 56 | | 1 | | 8 | |
| North Dakota | | 7 | | | | 4 | |
| South Dakota | | | | | | 3 | |
| Nebraska | | 7 | | | 1 | | |
| Kansas | | 23 | | | | 28 | |
| **South Atlantic** | | **224** | | **6** | **5** | **266** | **17** |
| Delaware | | 5 | | | | | |
| Maryland | | 30 | | 1 | 2 | 14 | |
| District of Columbia | | 20 | | | 1 | 4 | |
| Virginia | | 34 | | | | 83 | 4 |
| West Virginia | | 13 | | | | 47 | 3 |
| North Carolina | | 78 | | | | 69 | |
| South Carolina | | 8 | | | 1 | 8 | 6 |
| Georgia | | 27 | | 5 | 1 | 32 | 3 |
| Florida | | [3] 9 | | | | 9 | 1 |
| **East South Central** | | **101** | | **1** | **5** | **58** | **29** |
| Kentucky | | 39 | | | 2 | 16 | 16 |
| Tennessee | | 52 | | | 1 | 5 | 12 |
| Alabama | | 1 | | | 2 | 32 | |
| Mississippi | | 9 | | 1 | | 5 | 1 |
| **West South Central** | | **96** | | **1** | **7** | **550** | **50** |
| Arkansas | | 5 | | 1 | 1 | 52 | 6 |
| Louisiana | | 10 | | | | 1 | |
| Oklahoma | | 28 | | | 1 | 31 | 3 |
| Texas | | 53 | | | 5 | 466 | 41 |
| **Mountain** | | **154** | **1** | **2** | | **110** | |
| Montana | | 1 | | | | 9 | |
| Idaho | | 27 | 1 | | | 3 | |
| Wyoming | | | | 1 | | 4 | |
| Colorado | | 16 | | | | 11 | |
| New Mexico | | 3 | | | | 17 | |
| Arizona | | 8 | | | | 56 | |
| Utah | | [3] 98 | | 1 | | 10 | |
| Nevada | | 1 | | | | | |
| **Pacific** | | **433** | | | **4** | **53** | **1** |
| Washington | | 127 | | | 1 | 12 | |
| Oregon | | 61 | | | 1 | 6 | |
| California | | [3] 245 | | | 2 | 35 | 1 |
| Alaska | | 1 | | | | | |
| Hawaii | | | | | | | |

[1] Including cases reported as salmonellosis.
[2] Including cases reported as streptococcal sore throat.

# FOREIGN REPORTS

## CANADA

*Reported Cases of Certain Diseases—Week Ended Feb. 17, 1951*

| Disease | Total | Newfoundland | Prince Edward Island | Nova Scotia | New Brunswick | Quebec | Ontario | Manitoba | Saskatchewan | Alberta | British Columbia |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Brucellosis | 2 | | | | | 1 | 1 | | | | |
| Chickenpox | 1,233 | 1 | | 19 | | 263 | 661 | 41 | 19 | 82 | 147 |
| Diphtheria | 3 | | | | | 3 | | | | | |
| Dysentery, bacillary | 10 | 1 | | | | 6 | 2 | 1 | | | |
| German measles | 471 | | | 59 | | 34 | 241 | 4 | 18 | 58 | 57 |
| Influenza | 7,290 | 17 | | 3,407 | 3,192 | | 317 | 13 | 298 | | 46 |
| Measles | 2,881 | 4 | | 42 | 1 | 397 | 2,181 | 151 | 18 | 33 | 54 |
| Meningitis, meningococcal | 7 | | | | 3 | 2 | 1 | | | | 1 |
| Mumps | 1,505 | | | 23 | | 334 | 454 | 56 | 91 | 255 | 292 |
| Scarlet fever | 376 | 3 | | | 1 | 98 | 54 | 26 | 15 | 70 | 109 |
| Tuberculosis (all forms) | 146 | 10 | | 2 | 5 | 33 | 20 | 13 | 4 | 8 | 51 |
| Typhoid and paratyphoid fever | 26 | | | | | 8 | 1 | | | 1 | 16 |
| Venereal diseases: | | | | | | | | | | | |
| Gonorrhea | 257 | 5 | | 8 | 6 | 51 | 52 | 12 | 8 | 35 | 80 |
| Syphilis | 90 | 2 | | 2 | 2 | 35 | 21 | 7 | 7 | 2 | 12 |
| Primary | 2 | | | | | | 2 | | | | |
| Secondary | 3 | | | | | | 3 | | | | |
| Other | 85 | 2 | | 2 | 2 | 35 | 16 | 7 | 7 | 2 | 12 |
| Whooping cough | 172 | | | 23 | 2 | 22 | 84 | 17 | 7 | 3 | 14 |

## CUBA

*Reported Cases of Certain Diseases—5 Weeks Ended Dec. 30, 1950*

| Disease | Pinar del Rio | Habana | | Matanzas | Santa Clara | Camaguey | Oriente | Total |
|---|---|---|---|---|---|---|---|---|
| | | Habana City | Total | | | | | |
| Cancer | 5 | | 28 | 21 | 29 | 2 | 21 | 106 |
| Chickenpox | | 9 | 9 | 1 | | | 4 | 14 |
| Diphtheria | 1 | 9 | 15 | 5 | 2 | 1 | 6 | 30 |
| Leprosy | | | 2 | 8 | 1 | | | 11 |
| Malaria | | 1 | 1 | | 7 | 3 | 393 | 404 |
| Measles | | 19 | 19 | 1 | | 1 | 9 | 30 |
| Poliomyelitis | 1 | | | | 1 | 1 | | 3 |
| Tuberculosis | 1 | | 20 | 37 | 17 | 8 | 20 | 103 |
| Typhoid fever | 2 | 11 | 13 | 2 | 5 | 1 | 9 | 32 |
| Whooping cough | | | 26 | | | | | 26 |

## JAMAICA

*Reported Cases of Certain Diseases—4 Weeks Ended Jan. 27, 1951*

| Disease | Kingston | Other localities | Total |
|---|---|---|---|
| Chickenpox | 4 | 14 | 18 |
| Diphtheria | 2 | 1 | 3 |
| Dysentery, unspecified | | 1 | 1 |
| Leprosy | | 4 | 4 |
| Ophthalmia neonatorum | 1 | | 1 |
| Puerperal sepsis | | 1 | 1 |
| Tuberculosis, pulmonary | 35 | 43 | 78 |
| Typhoid fever | 15 | 45 | 60 |
| Typhus fever (murine) | 1 | | 1 |

## REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

**The following reports include only items of unusual incidence or of special interest and the occurrence of these diseases, except yellow fever, in localities which had not recently reported cases. All reports of yellow fever are published currently. A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.**

### Cholera

*India (French).* During the week ended February 17, 1951, 36 cases of cholera were reported in Pondicherry as compared with 17 for the previous week. Karikal reported 12 cases for the week ended February 17 and 3 cases for the week ended February 10.

### Plague

*Indochina.* During the week ended February 24, 1951, one case of plague was reported in Phanthiet, Viet Nam.

### Smallpox

*Burma.* Smallpox was reported in ports of Burma for the week ended February 24, 1951, as follows: Akyab 10 cases, Kyaukpyu 31, Moulmein 7, and Rangoon 9.

*India.* The incidence of smallpox in ports of India in general continues to increase. Seaports in which unusually large numbers of cases were reported for the week ended February 24, 1951 (figures in parentheses are for the previous week), are as follows: Calcutta 656 (637), Bombay 89 (72), and Madras 76 (79). The airport of Nagpur reported a decrease from 108 cases for the week ended February 10 to 73 for the week ended February 17.

*India (French).* During the week ended February 17, 1951, smallpox cases (176) in Pondicherry more than doubled the number (67) reported for the previous week.

## Course in Internal Medicine

A 2-week course in Recent Advances in Internal Medicine is being offered April 30 to May 12, 1951, by the Michael Reese Hospital Postgraduate School, Chicago. Clinical and didactic material pertaining to recent advances in diagnosis and therapy will be presented by members of the Department of Internal Medicine, other Clinical Departments, and the Division of Laboratories and Research.

For further information address: Dr. Samuel Soskin, Dean, Twenty-ninth Street and Ellis Avenue, Chicago 16, Ill.

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The printing of this publication has been approved by the Director of the Bureau of the Budget (August 10, 1949).

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the Public Health Service through the Division of Public Health Methods, pursuant to the following authority of law: United States Code, title 42, sections 241, 245, 247; title 44, section 220.

It contains (1) current information regarding the incidence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable disease throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

Requests for and communications regarding the PUBLIC HEALTH REPORTS, reprints, or supplements should be addressed to the Surgeon General, Public Health Service, Washington 25, D. C. Subscribers should remit direct to the Superintendent of Documents, Washington 25, D. C.

Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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